SPACEX

TEST DESCRIPTION

This application seeks to extend the previously authorized testing of SpaceX user terminals pursuant to section 5.61(c), allowing SpaceX to engage in continued testing of next generation devices without the need for successive STAs. These operations are currently authorized under ELS File No. 1721-EX-ST-2022. The substance of this request is unchanged and the proposed operations are fully consistent with the terms and conditions of that STA. The appropriate "stop buzzer" contact for these operations is the Starlink Network Operations Center, which may be reached by phone at (360) 780-3103 on a 24/7 basis. The experimental description and other attachments are provided again with this application for ease of reference.

Through this authorization, SpaceX Exploration Holdings seeks to test user terminals in fixed and ESIM configurations at transmit duty cycles up to the Commission's occupational/controlled exposure limits. The testing will involve up to 200 total user terminals, including a combination of fixed devices and ESIMs (which may include a combination of earth stations on vehicles, vessels, and aircraft) to be operated exclusively by SpaceX personnel. This testing will allow SpaceX to characterize the performance of these user terminals under a wide range of conditions and to measure the RF density of emissions from these user terminals. The earth station terminals requested will enable SpaceX to fully evaluate the operational characteristics of these terminals under conditions that resemble the initial commercial rollout of these devices to the greatest possible extent.

Background

The Commission has already granted SpaceX Services Inc. a blanket authorization to commercially deploy an unlimited number of fixed and ESIM user terminals that communicate with SpaceX's NGSO constellation.[1] The Commission also previously authorized SpaceX to conduct testing of fixed and ESIM user terminals in a variety of configurations.[2] With this application, SpaceX seeks to authorize testing for new user terminal hardware.

Interference Protection

Although SpaceX intends to test multiple potential user terminal configurations, all will share the technical characteristics listed below and will operate within the EIRP density mask provided in this document.

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1 *See* SpaceX Services, Inc., Radio Station Authorization, IBFS File No. SES-LIC-20220125-00081 (issued May 16, 2022); SpaceX Services, Inc., Radio Station Authorization, IBFS File Nos. SES-LIC-20210803-01360, SES-LIC-20210803-01361, SES-LIC-20210809-01568 (issued June 30, 2022).

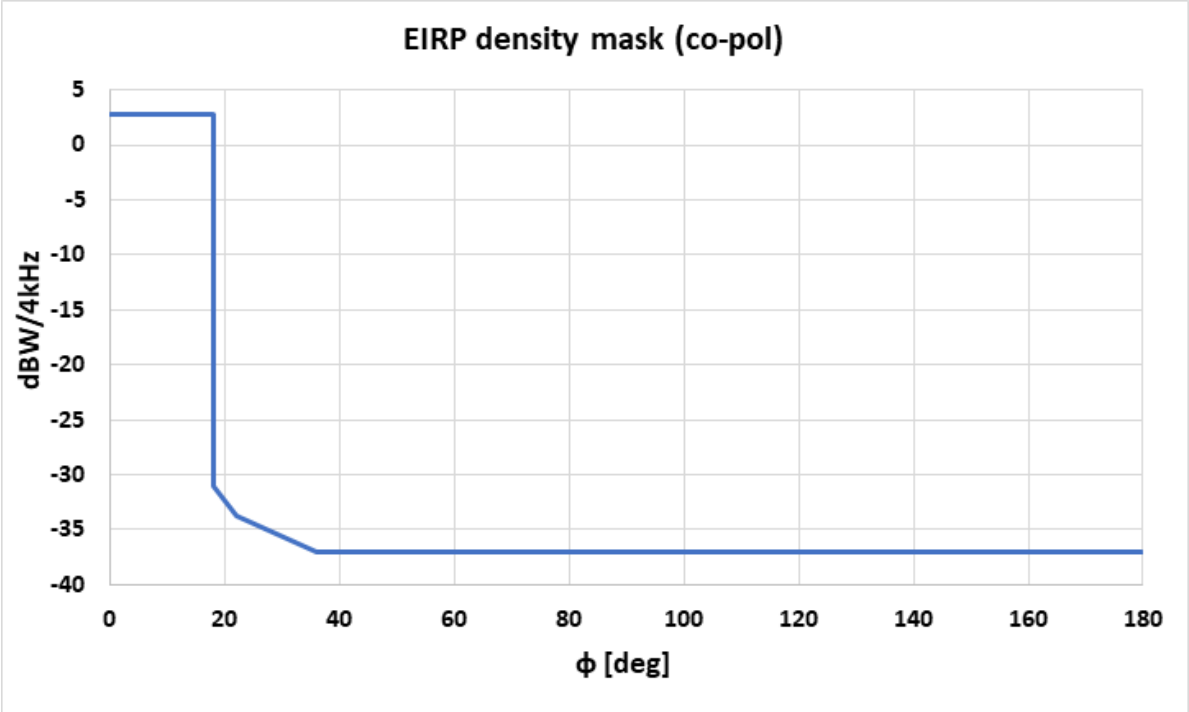
2 *See, e.g.*, Space Exploration Holdings, LLC, Experimental Special Temporary Authorization, ELS File No. 0190-EX-CN-2022 (granted May 26, 2022) (call sign WM2XNK).

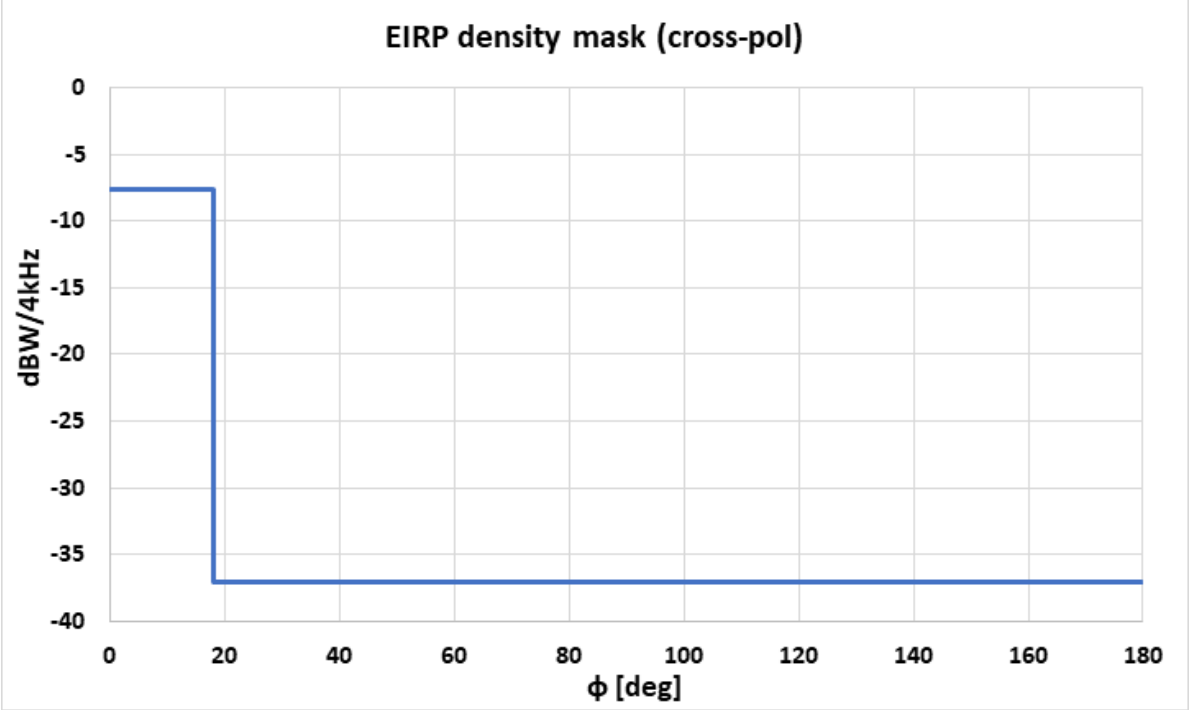
Link Type	Frequency	Modulation	Emission Designator	Maximum EIRP
Broadband Downlink (space-to-Earth)	10.7-12.7 GHz	Up to 64 QAM	240MD7W	N/A
Broadband Uplink (Earth-to-space)	14.0-14.5 GHz	Up to 64 QAM	60M0D7W	44.5 dBW

The proposed operations will protect other systems from interference generally by complying with the same limits that apply to other authorized SpaceX user terminals and to the SpaceX earth station network as a whole. These measures are further described in a separate attachment. In the extremely unlikely event that harmful interference should occur due to transmissions to or from these terminals, SpaceX Services can be reached at its Starlink network operations center via phone at (360) 780-3103 or email at satellite-operators-pager@spacex.com, which links to the pagers of appropriate technical personnel with authority and ability to cease all transmissions from these user terminals on a 24/7basis.

Antenna Performance

The user terminals all will comply with the EIRP mask depicted below.





RF Safety

The operations described in this application would occur only under controlled conditions and would not involve members of the public. Thus, under the FCC's current RF-exposure guidance, these SpaceX user terminals may operate at a duty cycle of up to 73%—the appropriate limit for occupational exposure under current OET guidance.[3] The details of this radiation hazard analysis are included as a separate attachment to this application.

[3] *See* Federal Communications Commission Office of Engineering and Technology, *Evaluating Compliance with FCC Guidelines for Human Exposure to Radiofrequency Electromagnetic Fields* (1997).